



A review of the European summer heat wave of 2003

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Abstract:

This paper reviews the European summer heat wave of 2003, with special emphasis on the first half of August 2003, jointly with its significant societal and environmental impact across Western and Central Europe. We show the pattern of record-breaking temperature anomalies, discuss it in the context of the past, and address the role of the main contributing factors responsible for the occurrence and persistence of this event: blocking episodes, soil moisture deficit, and sea surface temperatures. We show that the anticyclonic pattern corresponds more to an anomalous northern displacement of the North Atlantic subtropical high than a canonical blocking structure, and that soil moisture deficit was a key factor to reach unprecedented temperature anomalies. There are indications that the anomalous Mediterranean Sea surface temperatures (SSTs) have contributed to the heat wave of 2003, whereas the role of SST anomalies in other oceanic regions is still under debate. There are methodological limitations to evaluate excess mortality due to excessive temperatures; however, the different studies available in the literature allow us to estimate that around 40,000 deaths were registered in Europe during the heat wave, mostly elderly persons. Despite previous efforts undertaken by a few cities to implement warning systems, this dramatic episode has highlighted the widespread un-preparedness of most civil and health authorities to cope with such large events. Therefore, the implementation of early warning systems in most European cities to mitigate the impact of extreme heat is the main consequence to diminish the impact of future similar events. In addition to mortality (by far the most dramatic impact), we have also analyzed the record-breaking forest fires in Portugal and the evidence of other relevant impacts, including agriculture and air pollution.

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Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

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Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Climate Change and Human Health Literature Portal

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Europe

Health Impact:

specification of health effect or disease related to climate change exposure

Injury

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Elderly

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content